FOOD MANUFACTURE

FOOD
MANUFACTURE

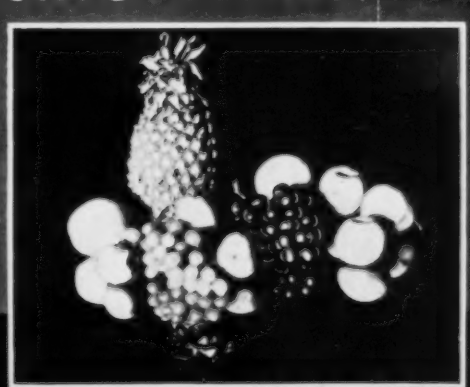
PUBLISHERS: LEONARD HILL LIMITED, 17, STRATFORD PLACE, LONDON, W. 1 OCTOBER 6, 1

By Appointment to the Late King George V

"STAYBRITE"
REGD. TRADE MARK
SUPER STAINLESS STEEL

Potted shrimps, lemon cheese, or liver extract - baby foods or butter - toffee or orange marmalade - "Staybrite" Steel is the ideal, ever-hygienic metal for plant for their preparation. In almost every kind of food preparation apparatus "Staybrite" Steel is (or could be) making for cleanliness, greater strength, better appearance or, most importantly, freedom from corrosion and contamination.

IDEAL FOR ALL FOOD PROCESSING PLANT.



FIRTH-VICKERS STAINLESS STEELS LTD SHEFFIELD

FIRMS WITH REPUTATIONS TO HOLD BANK ON GOLD SEAL CAP COMPOUND

The HARTLEY packs shown above had been EIGHT YEARS in store when the Vacuum Test was made. After eight years the pack still held a nine-inch vacuum!

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★ CONSULT YOUR CAP MAKER ABOUT GOLD SEAL CAP COMPOUND OR ASK US ABOUT IT

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A JOURNAL DEVOTED TO THE PRODUCTION AND MANUFACTURE OF ALL EDIBLE COMMODITIES INVOLVING A PROCESS OF MANUFACTURE.

FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

VOLUME . . . XIV

NUMBER . . . 10

OCTOBER 6, 1939

Plant and Equipment Number

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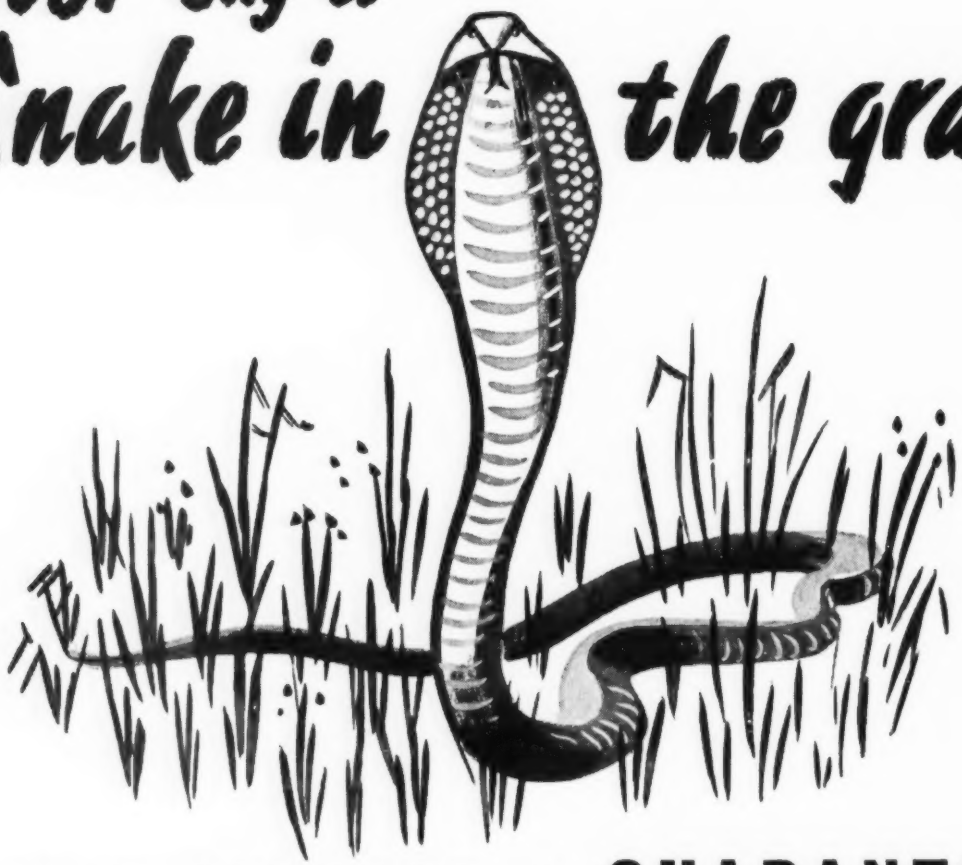
The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

Never buy a Snake in the grass



OR SALT WITHOUT A GUARANTEE

In a naughty world things are seldom what they seem. So never buy salt without a guarantee of purity. Not just a promise ; not a verbal guarantee, but a written one, clear, concise and unequivocal. Insist in fact on a signed guarantee like this*, which you will receive in black and white with every bag of 'Lymm-Pure-Salt', and which is given with no other salt.

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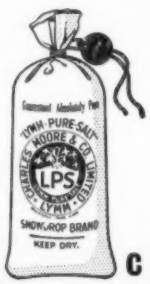

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Facing first page of Editorial

FOOD MANUFACTURE

Vol. XIV, No. 10 October 6, 1939

Our Symposium

ONE OF the problems confronting a would-be purchaser of plant (possibly in a hurry to acquire it) is—where to get it.

It is even possible that the manufacturer, while knowing exactly what he wants it to do, is not quite familiar with the type of plant to ask for.

To this and other classes of manufacturers we feel confident that the plant and machinery symposium published in this issue should be of considerable service, especially in these times.

Food Manufacture and *Food Manufacture Weekly*, as we have pointed out, are still carrying on, and our enquiry service is available to those seeking information on special plant, as well as those seeking technical advice.

Food Conservation

The problems of food conservation in relation to the national food supply received considerable attention at the meeting of the section of medical sociology at the British Medical Association's meetings recently.

Sir Joseph Barcroft opened the discussions and began by disclaiming any intention to deal with Government policy, as he said how much they saw fit to store was not his affair. What he was concerned with was what science has done to increase the selection of food at our disposal. He divided all foodstuffs, like ancient Gaul, into three classes: those which keep indefinitely, for practical purposes say ten years; those which can be kept for a season, say ten months; and those that can be kept on an ordinary voyage, say two months or less.

In the first group is wheat. Its storage against emergencies is as old as the Book of Genesis, and everyone has heard of Joseph's seven-year plan. Care must be exercised, however, and not all wheat as harvested will keep indefinitely. The critical property is the moisture content. If the moisture content is low—say below 12 per cent.—the wheat will keep, but English wheat with its moisture content of 18 per cent. and over will not keep. This does not matter much, as our native wheat is generally used as soon as it is threshed. A very important point to be considered in regard to the storage of the dry wheats is the influence of weevils. Wheat which is to be stored for a long time should be freed of weevils by treatment with calcium cyanide or some other sterilising process and, if possible, stored in an atmosphere of carbon dioxide. Flour occupies far less storage space than wheat, and if milled at a moisture of 11 per cent. or less and stored in good conditions—say in hermetically sealed tins—it will keep for years.

Whale oil and vegetable oils keep for three or four years in absence of air. Canned meats, if properly packed, will keep for many years. Of the seasonal foods milk is the most important. The best dried milk will keep at refrigeration temperatures for ten years. Potatoes are generally only kept for a season, but will last longer if dried to a moisture content of 8 per cent. Eggs are preserved best in cold storage in an atmosphere containing 2 to 2½ per cent. of CO_2.

Fish and Vegetables

Fish, unlike meat and game, does not improve on hanging. Marine bacteria are the main agents of spoilage. Even under the best conditions gutted white fish will not keep fresh in crushed ice for more than a fortnight. Herring stored without gutting will not last a week. Smoked fish—finnans and kippers—keep satisfactorily no longer than a week at ordinary temperatures and no longer than a fortnight at 0° C.

The bulk of our national supply of fish is normally stored only for such short periods. Both white and fatty fish can be held in excellent condition for a season—*i.e.*, anything from two months to a year—by proper freezing and cold storage. Herring, if rapidly frozen, well glazed and stored at −30° C., will remain in first-class condition for six months, after which the fat gradually becomes rancid. Fish can also be successfully stored by canning. Certain oily packs of canned fish have been successfully preserved for years. We have ourselves consumed with relish sardines of a 20-year " vintage ".

Fruit and vegetables present different problems. For long-distance transport and for season-to-

season storage refrigeration is used, together with control of the oxygen and carbon dioxide composition of the atmosphere of the store. For longer storage three methods are available—freezing, drying and canning. In the case of canned fruit it is really the deterioration of the can rather than the contents which determine the life of the tin, as the metal is corroded by the acid liquids. Lacquering does a lot of good, but does not completely protect the can. Black currants, cherries and damsons have, however, been kept for six years, raspberries, loganberries, blackberries and strawberries for four years, beetroot and carrots seven years and peas ten years. If canned goods are held at low temperature their storage life is increased considerably.

Freezing and holding at a very low temperature is an obvious method for preserving fruit and vegetables. The freezing must be carried out sharply so that more of the juice is retained on thawing. Dried products are in three categories—seeds and seed products, products like raisins which bear no resemblance to the fresh fruit, and apples, pears and vegetables which simulate the fresh article when reconstituted with water. A new method of low temperature drying produces dried products which retain their natural shape and colour and the natural flavour.

Apples

One of the striking aspects of the English scene at this moment is the apple trees literally groaning with their burdens. It is, as our contributor Mr. Vernon L. S. Charley says, well and truly the "glut that was to come". Much of this fruit will be lost except for such fertilising properties as they may possess. It is a pity, but it is one of those things that cannot be foreseen.

As Mr. Charley says, it is quite possible to handle an enormous amount of material but—is it going to be sold after it has been prepared?

We possess, we believe with reason, a tremendous faith in the possibility of our navy to ensure supplies of foodstuffs from overseas, but if it had been possible to produce huge stocks of juice containing sugar in assimilable form it would have been all to the good. We have certainly been very backward in this apple juice business, and it is not by any waving of a magician's wand that the necessary plant can be conjured forth.

We hope, however, that Mr. Charley's suggestions in the article we publish will stimulate manufacturers and others in the matter of making the best use of one of the gifts the gods have sent this year with so lavish a hand.

Topical Trickery

The very latest trick has been recently played, or attempted to be played, on a Manchester confectioner, according to the *Confectionery News*. A well-dressed stranger calls, says he is from the War Office or the Defence Ministry, and produces a card with the words "Home Defence", and in smaller type underneath, "Food Supply and Rationing Dept.". He demands to look over the stock, and if the shopkeeper demurs he is told to get in touch with the local authorities. Meanwhile the stranger has no time to waste, so the shopkeeper had better be quick and say what he intends to do.

The "representative" is allowed to look round and expresses surprise that the proprietor knows nothing about the purpose of his visit. The idea behind it all, he explains, is that certain shops have been picked as suitable for storing food and that certain commodities at present there would have to be removed. Meanwhile the stranger is inspecting the stock. "Those will have to go", etc.

His assistant should be here at any moment with a car. In the meantime the confectioner is promised a salary and an additional sum per month.

In the case reported the "representative" luckily did not get away with it, and it is only by sheer luck (as the confectioner admits himself that he believed his visitor) that he did not lose a lot of stock. A barefaced attempt at robbing business men.

Advertising

Much ink has been spilt on the question of the future of advertising during the war period, and many have been the reactions to the new set of conditions which has intervened. One of the most deplorable of these is that of some firms, happily few, who consider that they are entitled to break all existing contracts. We say happily because if this were the general point of view a large part of the business of the country would cease, and it is a fair question to ask who would then pay for the war?

There were some people who wondered whether Food Manufacture would carry on. Not only is it going to carry on, both weekly and monthly, but it will fulfil even more important functions in keeping the industry posted on technical developments, official announcements and many other matters.

We take this opportunity of thanking our advertisers who, with very few exceptions, have promised us their continued support in the knowledge that food manufacturers will be busier than ever, and

will still require the various services that we have been able to render them in the past.

Emergency Lighting

The demands of A.R.P. in the matter of factory lighting, or rather the obscuring of any light visible from the outside, are causing manufacturers some considerable anxiety. Many food factories are now working at full pressure, and as the nights draw in there must be no curtailment of production because of inadequate preparations for obscuring lights.

Many firms have adopted the simple expedient of blacking out their windows and north lights, but, as usual, science has stepped in and demonstrated a new use for complementary colours. A red light is completely invisible when looked at through blue glass, but for complete suppression of the light the tinting must be very accurate.

A cellulose acetate derivative called Rhodoid has been recently perfected by May and Baker, Limited. This will prove of great value for darkening windows of factories where curtains are neither practicable nor desirable. Tests have been made at the Government's building research station at Watford. A room was fitted with lamps covered with pink-tinted rhodoid shades. A similar tinted pale blue covering to the windows made the pale red light from the lamps completely invisible from the outside. The material is fixed permanently to the inside of the windows by an adhesive. When there is no danger from an air raid, windows can be left open in the usual way and admit daylight. At night, with all lights on and no opaque covering across the windows, no light can be seen from outside. If an air raid warning is received all that is necessary is to close the windows and fix the pink lampshades.

Milk Tests

The methylene blue reductase test for the purity of milk has been employed in this country for a long time, but doubts of its efficiency have been cast by different workers from time to time. For the last ten years the sanitary officers in Italy have been endeavouring to improve the cleanliness of the milk supply and the main test used has been the plate count. This has not proved entirely satisfactory, and Asdrubali (*Ann. Igiene* [*sper.*], 1939, p. 218) has examined 120 samples of milk by means of the plate count, Breed smear count, the modified reductase test, the keeping quality test and the titratable acidity test. The relation between the reduction test and the bacterial cleanliness of the milk as judged on the basis of the other four tests was then worked out. In 90 of the samples the plate count and the reduction tests were in good agreement. In the remaining 30 samples the results of the two tests were discordant. In 27 of these the reduction test gave the right and the plate count the wrong answer. The agreement between the reduction and the keeping quality tests was very striking. Duplicate comparative tests made between the plate count and the reduction test on the same samples of milk by two or more workers gave complete agreement in the reduction test but disagreement in the plate counts. Ciani, another Italian worker, has explored the possibility of using the reductase test for controlling the bacterial cleanliness of pasteurised milk, and his results agreed with those of Asdrubali on raw milk. These intensive studies establish once and for all the superiority of the methylene blue test in the way of sensitivity, accuracy and simplicity over the plate count method.

Diet and Ill-Health

We referred last month to the incidence of diseases in the Colonies and the influence of malnutrition. Since writing this we have noticed a book by Dr. Purcell on Diet and Ill-Health on the Gold Coast. The author, who is a medical officer on the Gold Coast, has collected cases which show evidence of malnutrition. The book, which is quite small (only 77 pages), is divided into two sections. The first deals with the local dietary at Oda, the chief town, and in scattered villages in the forest areas where the main industry is cocoa farming. The second part deals with cases of malnutrition and related diseases, chiefly among the children. Some tribes live mainly on a staple diet of plantain, cocoyam and cassava, while those in the northern territories live mostly on millet and some meat. On the coast fish appears in the diets.

The importance of nutritional œdema and skin disorders in the diagnosis of malnutrition is stressed and cases are described showing many features of the pellagra syndrome.

Dr. Purcell points out the difficulty of detecting subjective symptoms in primitive communities—for example, the detection of defective sight among those who are illiterate. The book is of importance to those who have to deal with administrative problems of ill-health on the Gold Coast and many suggestions are made to improve the dietary, particularly the wider use of green, leafy vegetables, which could be grown cheaply and fall within the limited financial resources of these communities.

SYMPOSIUM OF PLANT PROGRESS—1938-39

MIXING AND FILLING

For Loose Powders

AN INTERESTING filler for everything loose—powder or granular, fine or coarse—is one of the many items made by the Alite Patent Machine Co., Ltd., of London, N. 7.

The Alite loose filler has a non-jamming clutch and slow-motion agitator mechanism.

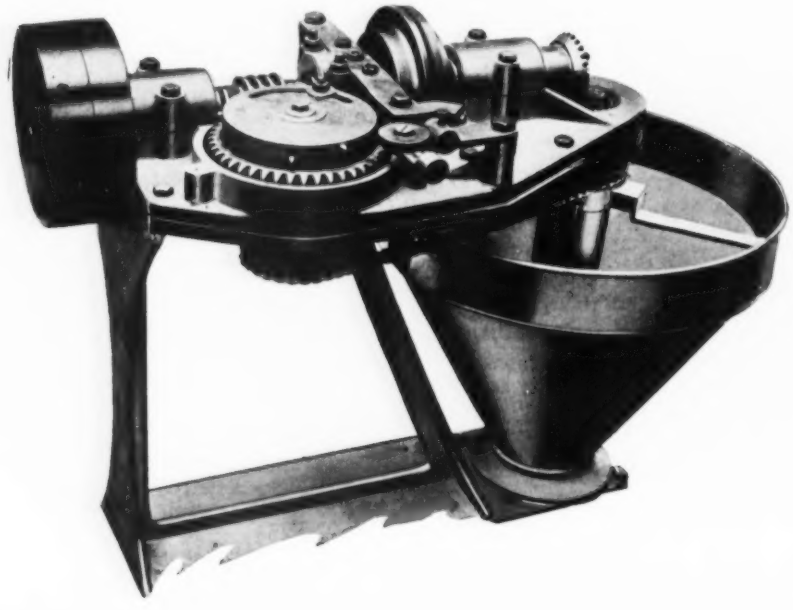
It fills specific quantities from 100 milligrams to over 1 lb. with exactness, and in a typical test the average area in 22 fillings of 5 grams each, taking 15 minutes in all, was 0·7 per cent.

The machine can be quickly adjusted to take different types of containers, is easily cleaned and prevents "fluffing" and "bridging".

Other items are the Alite sifter and mechaniser which blends, sifts and mixes, and the Alite compression filler for pastes, powders, mincemeat, etc.

"Wobbling Drum Mixer"

A patent horizontal type of "Wobbling Drum Mixer" for mixing meals, grains, salts, and any other granular or powder-like materials was not long ago introduced to the industry by J. Booth and Son, Limited, of Congleton, Cheshire. While its action is no better than the firm's Patent Universal Mixer, it has been designed for smaller capacities of 3 and 5 cwts., so as to come in between the Universal Mixers, whose sizes range from 10 cwts. up to 50 cwts. capacity. Other items include the Centrifugal Crushing, Sifting and Mixing machine for breaking up and sifting any kind of custard or other powders which have gone hard through storage, and food manufacturers have evinced considerable interest in the improvements achieved in the Universal Mixers by additional inner mixing buckets and scrolls. Where necessary, automatic sprayers for essences and oils are fitted with the mixers.



The Alite Loose Filler.

Patent Shredding and Granulating Machine with reciprocating sieve separator and vibrationless drive direct motor driving.

William Gardner and Sons (Gloucester), Ltd.

Dry Powder Mixing

The figure below shows a view of a No. 4 size British Rema machine, with top half of casing removed, recently supplied to operate on dry powder mixtures. The casing, endplates and mixing elements are of all steel construction, giving great strength with low weight ratio, together with a clean-cut design.

The top cover, attached to which is the feed hopper, is of hinged pattern, secured in position by wing nuts and swing-aside bolts, but capable of being opened quickly for full access to the interior of the mixing chamber.

Where periodic and scrupulous cleaning requires to be carried out, as, for example, when changing over from one range of materials to another, the top portion of the casing can be removed from a point immediately above the main bearings, thus exposing fully the mixing elements and casing interior. The top portion of the casing may be hinged at this point if desired, with the top cover made a fixture.

Various sizes of mixer are manufactured, covering batch capacities of from 80 lb. to 2,240 lb.

The makers are Edgar Allen and Co., Limited, of Sheffield.

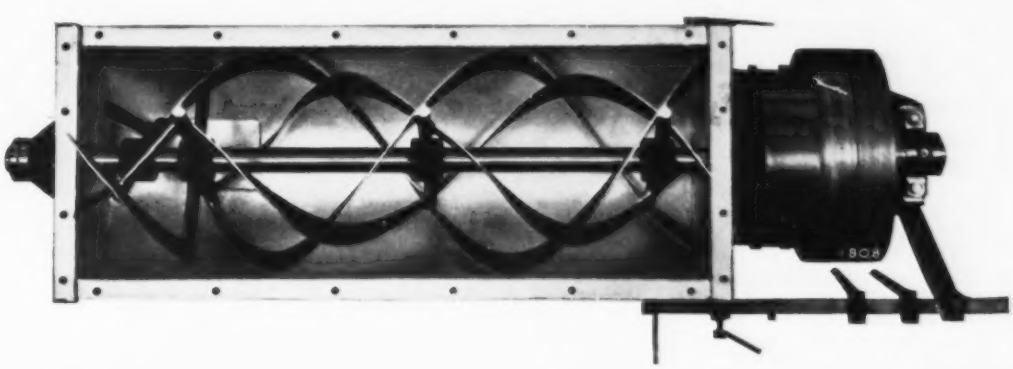
PUMPS AND COMPRESSORS

Horizontal Vacuum Pump

The machines for which there is the greatest demand from the Food Industry is their horizontal vacuum pump, say Reavell and Company, Ltd., Ipswich. They are of the horizontal, double-acting dry vacuum type. The maximum vacuum obtainable with a 30-in. barometer varies from 29·4 in. with the small sizes and 29·6 in. for the large sizes.

These machines are also arranged so as to operate on the two-stage principle, in which case the vacuum obtainable is within one-tenth of an inch of the barometer.

Of compressors there is an addition to the firm's range in the form of the 400 cu. ft. Two-Stage Compressor, which successfully fills in the gap between the Single-Acting Vertical type and the Two-Stage Double-Acting Vertical type, which is rather expensive for anything less than 500 cu. ft.



No. 4 Size British Rema Machine.

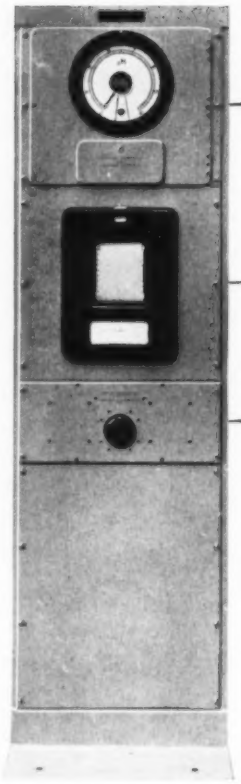
INSTRUMENTS

*p*H Measuring Equipment

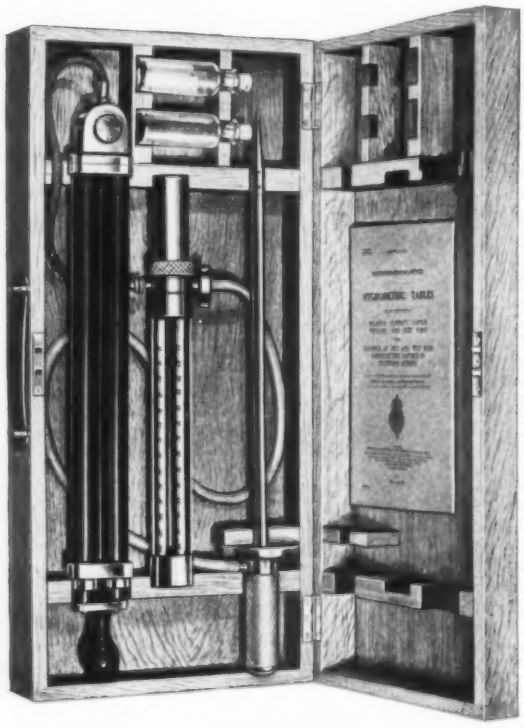
In the preparation of fruit jellies and jams, the formation of jelly depends on *p*H values, the optimum values for pectin and pectase being 3·0 and 4·3 respectively. The sterilisation and preservation of flavour of all classes of canned goods are also influenced by *p*H values.

In connection with dairy products, bakery, brewing, sugar refining, purification and sewage disposal, to mention some of the items of interest to the food industry, the determination of *p*H values is of importance.

Marconi-Ekco Instruments, Ltd., of London, W.C. 2, supply mains-operated equipment which comprises a thermionic self-balancing potentiometer operating a large-scale indicating meter or recording controller suitable for all industrial applications. The instrument, which is designed to operate in conjunction with an immersion or continuous flow glass electrode assembly, can be supplied in various forms: (*a*) with large-scale indicating meter and/or recorder. This recorder may be of the circular chart or continuous writing type. This is shown in rack mounted form in the illustration; (*b*) with large-scale indicator and separate controlling recorder; (*c*) with indicating controller. This unit may be mounted in place of the indicator illustrated. These optional units may be mounted in rack form or in wall type cases.


Thermionic self-balancing potentiometer with large scale indicator. This unit may be supplied for wall mounting.
Recorder panel which may alternatively be remotely located.
Stabilising Transformer Unit.

Industrial pH Assembly



Rapid Moisture Determination

An entirely new instrument for determining the percentage of water in substances is the "CLB" Hygroscope, made by the C. L. Burdick Manufacturing Co., Holborn Viaduct, London, E.C. 1.

This invention is based on the principle that the humidity of the air in the interstices of a substance is a correct indication of the percentage of water present.

It is well known that air which is in close contact with a hygroscopic substance such as grain, tobacco, tea and textile materials will, in a short time, come to equilibrium with the quantity of water contained in the substance, so that, by measuring the relative humidity of this air, the percentage of water to substance can be determined with great accuracy.

In the "CLB" Hygroscope the wet and dry bulb method of determining the relative humidity of the air in the interstices has been adopted. This method gives both accuracy and speed: the time required for a test is less than three minutes.

The apparatus, which is shown in the accompanying illustration, is supplied with psychrometric tables, and consists of three units.

Firstly, there are two specially designed wet and dry bulb thermometers, mounted in a casing, with a container for a supply of water and an air filter; secondly,

a double-acting suction hand pump; and, lastly, an insertion piece which is introduced into the substance to be tested.

The operation of the pump—taking from 60 to 90 seconds—secures a constant flow of air from the substance over the two bulbs. The air passes the bulbs at a speed of 8 to 10 ft. per second and results in a perfect cooling of the wet bulb.

The differential between the readings of the bulbs is taken, and, by reference to the tables supplied, the correct relative humidity is ascertained at once.

Trial tests with quantities of each class of substance will show the variations in relative humidity; from this it is possible to determine the variations of water present in each case.

Tabulated lists can then be prepared, and when subsequent readings are taken they will give the percentage of water to a high degree of accuracy. Some tabulated information can be supplied by the makers.

Electrical Determination of Salts in Meats

The Meg Salinity Tester enables the percentage of salt in lean meats to be ascertained without spoiling the meat or interrupting the cure. It has been produced in conjunction with the British Food Manufacturers Research Association and tested out at their laboratories.

In addition to testing the salinity of cured meat with a view to ascertaining if the cure is complete, the instrument may be used to ascertain the rate at which salt penetrates into the meat from different strengths of pickle. It also furnishes a convenient method of determining the thickness of the outer fat layer.

The instrument essentially measures the electrical resistance of the meat at different depths. To establish the relationship between the ohmic resistance and the salt content, a very large number of tests have been conducted by the B.F.M.R.A. on pieces of specially pickled lean meat.

As the resistance of a given specimen of meat varies with the temperature, the instrument scale is plotted for three temperatures likely to be encountered in practice—namely 5°, 10°, and 15° C.

The Tester is used in conjunction with a special Probe which is inserted into the meat to be tested. It consists of a hand-driven electrical generator and a direct reading ohmmeter combined in a case of cast aluminium. When the generator handle is turned, alternating current flows from one electrode of the Probe to the other through the sample meat under test, and the electrical resistance of the latter, which is governed by the salt content, is measured on the ohmmeter. Alternating current is used to prevent electrolytic action at the electrodes. To ensure steady readings, the generator is provided with a centrifugally operated constant-speed clutch.

Full details of the method of use and interpretation of results may be obtained from the makers, Evershed and Vignoles, Chiswick, London, W. 4.

BOILER-HOUSE EQUIPMENT

Mechanical Stoking

In a publication issued by Hope's Heating and Lighting, Ltd., of Birmingham, are shown some typical examples of the use of their "Motor Stokor".

Among these are two Ruston and Hornsby boiler installations equipped with Motor Stokor mechanical firing. One is a vertical Thermax boiler with stoker, which was installed by Jerram and Co., Ltd., Derby, and the other a typical example of a modern Motor Stokor fired steam generating plant with a horizontal multitubular boiler. Both are noticeably clean and accessible layouts operating at high efficiency.

Another illustration shows one of the largest Cochran vertical boilers being mechanically fired. This type of stoker is provided with side grates to permit of forced draught firing on peak loads and hand firing in emergency.

In addition to industrial stokers, the firm manufactures automatic stokers in domestic sizes for residences and all buildings where the industrial stoker does not apply.

Three Hope Heavy Duty Mechanical Stokers firing three large vertical steam boilers.

Coal Meters for Mechanical Stokers

In view of the extended use of Underfed Screw-type Stokers in connection with many kinds of boilers, the Lea Recorder Co., Ltd., of Manchester, have recently developed a new type of Coal Meter, specially suitable for such stokers and embodying several important improvements.

These meters measure the amount of coal consumed by Lancashire, Cornish, Economic and other types of boilers operated by Screw-type Mechanical Stokers.

One of the main objects aimed at was to design a meter in such a manner that the volume or weight of the coal consumed may be read off directly, in cubic feet or lbs., without further calculation.

The company has issued a useful booklet giving full explanations of their meters and their applications.

Cast-Iron Fuel Economisers

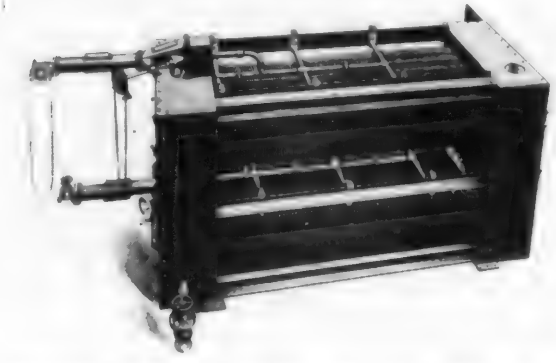
An outstanding development in steam-boiler practice is the new "Premier Diamond" horizontal gilled tube fuel economisers, with rectangular gills, that have been placed on the market by E. Green and Son, Ltd., Wakefield, after several years' intensified development work.

The new economiser is available in two types—cast-iron tubes with integral cast-iron gills, for up to 650 lb. per sq. in. pressures, and steel tubes with cast-iron gilled sleeves shrunk on, which also prevent external corrosion, for almost any pressure, up to 4,500 lb. per sq. in. if necessary.

With "Lancashire" and other cylindrical boilers the economisers may be fixed either directly behind or above the setting, with vertical travel of the flue gas—that is, up to the top of the economiser and down over and between the horizontal tubes to the chimney or induced draught fan.

For cleaning, a travelling steam-jet soot-blower is provided, which in most cases need be operated only once per shift. The amount of soot and dust actually deposited on the tubes is extremely small under normal conditions.

Other advantages are the very high thermal efficiency, since the rectangular gills have a much larger area than ordinary circular gills, and the fact that during examination every portion of the outside of every tube can be seen at a glance, since there is an easy straight view diagonally through the sections. This is particularly valuable, especially in Great Britain in view of the requirements of the Factories Act, 1937, whilst internal inspection is an easy matter. The whole arrangement also allows of an efficient streamline flow of the combustion gases, while in addition the water has an easy flow.



"Premier Diamond" cast-iron economiser with sides and top of casing removed showing the travelling steam-jet soot-blowers.

E. Green and Son, Ltd., Wakefield.

Water Circulation in Steam Boiler Plants

The main factors in economical evaporation, according to Owen's Engineering Industries, Ltd., the manufacturers of "Owen's Boiler Circulators" are as follows:

Uniformity of temperature which tends to prolong the life of a boiler by preventing the production of deteriorating strains from unequal expansion and contraction.

Ample boiler space, owing to the necessity that all water-space shall contain solid water, and permit the flow of unbroken currents of water over the heating-surfaces. The flow of return-water in cramped water-space may leave the heating-surface momentarily dry.

Free escape of steam from the heating-surfaces is also essential to evaporative efficiency. Unless the vertical movement of the current of steam bubbles be obstructed, steam always rises vertically from the heating-surfaces.

A large capacity of steam-space is essential to prevention of variation of steam-pressure. When the steam-space is deficient the pressure of the steam may vary with each stroke of the engine.

The production of dry steam by a boiler is of paramount importance—the tranquil release of the steam from the water is essential, as water entrained is liable to contain grit, etc., which may injure the surfaces of valves

and cylinders. A steady water-level greatly conduces to the production of dry steam. The durability of a steam-boiler partly depends upon the maintenance of uniformity of temperature in working it and great variations of temperature of the furnace and flues produce unequal expansion and contraction—improved circulation of the water will prevent this.

Large revenues may proceed from small economies effected in the generation and use of steam. Circulators have been proved to prevent over-heating, and will definitely help to prolong the life of any type of steam-boiler.

FUEL OIL BURNERS

Liquid Fuel Oil Burners

These burners are suitable for practically any type of process work—*i.e.*, paint and varnish boiling, continuous kilns, central heating, and, in fact, wherever an inexpensive and easily controlled source of instantly available heat is required. Two well-known and successful liquid fuel burners, electrically driven, are the "Standard" and "Major" Hydra burners, capacities of the former being 1 to 5 gallons of oil per hour (150,000 B.T.U.'s equal 1 gallon).

A new development is also the new "Magna" Burner Head. This model has been introduced to cater for an independent air feed when it is a necessity for larger fuel consumption up to 25 gallons of oil per hour.

The makers, Hydran Products, Ltd., of Staines, Middlesex, say that there is a very brisk demand for each of these types because it is becoming appreciated more and more that the method of atomisation by rotation of the cup and the variable stroke metering pump—acting as a fuel supply pump with its micro-metering device for controlling the flow of fuel, in place of needle valves, etc.—are the most important features in the burning of liquid fuels. Proof of these statements is evidenced by the ease with which it is able to burn, without special preparation, the heaviest of fuel oils, many liquids, amongst them used engine oil and waste of all sort, which have previously had more nuisance value than usefulness.

BOILING PANS

A Special Pan

There are food manufacturers who sometimes need special features of design of boiling pans. William Brierley, Collier and Hartley, Ltd., of Rochdale, Lancs., have recently supplied a pan with a very special exhibition finish for a large "show" kitchen of a food factory. Among other points the whole pan is covered by an apron which has a special lagging inside it. A balanced hinged lid of stainless metal is also fitted.

Another interesting item we have noticed is a monel metal receiving vessel having compressed air connections. Syrup solutions are fed to this vessel from an overhead feed direct into the funnel or hopper, the valve below which is then shut. Forty pounds per square inch compressed air is then introduced so that the batch is blown through piping to another department. The firm has also brought out some useful cutting and trimming machines for ginger and pineapple fingers.

A.C. AND D.C. MOTORS

CONTROLLED TORQUE

The most important feature for ensuring the correct application of an Electric Drive is the Torque characteristic of the Motor. By making variations in the Rotor design various characteristics can be obtained.

"Brush" have specialised in the design necessary for torque control, and the "Contorq" range of motors is designed to meet the requirements of each particular industrial application.

It is found that many troubles which occur in service conditions are due to unsuitable torque performance of the motor in use.

Brush Engineering Co., Ltd.

A.R.P. EQUIPMENT

Auxiliary Power and Lighting Plant

The continuous demand for self-contained Auxiliary or "Stand-by" plant for power and lighting purposes during the recent crisis has made it abundantly clear that the danger resulting from "main supply" failure in time of hostilities is fully realised by all concerned.

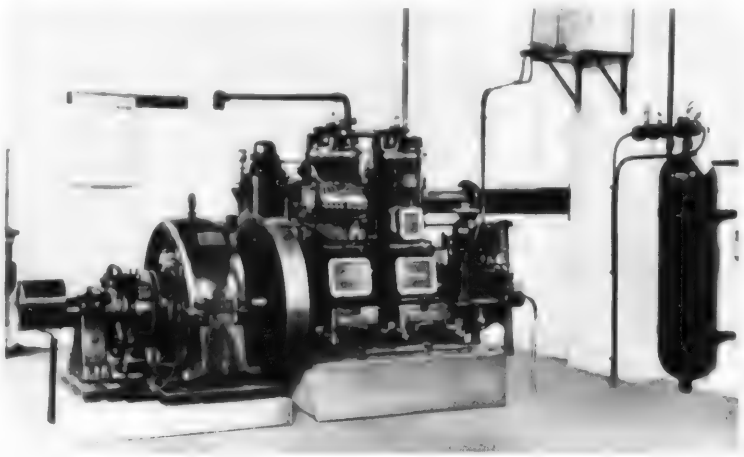
As manufacturers of complete equipments ranging from small sets suitable for "Pilot" lighting systems up to modern power station requirements, Petters, Ltd., of Loughborough, are prepared to consider the particular requirements of prospective buyers and to put forward equipment most suited to their needs.

For immediate or early delivery is a range of "Petter" Light and Power Sets meeting most requirements.

A feature of these sets, apart from their well-known reliability and economical running, is the small amount of space required—often the vital point when the set is to be installed underground. Recently Petters were privileged to supply sets for "Stand-by" and "A.R.P." purposes to important public institutions and industrial concerns, where the danger to life and plant resulting from an immediate "Black-out" can only be imagined and is impossible to calculate.

Regarding the small sets suitable for "Pilot" lighting, these can be arranged for completely automatic operation, so that they will start up and remain in operation immediately the "mains supply" fails.

Among the large selection of other equipment made by the company may be mentioned the Petter Petrol Engine Compressor Set; Semi-Diesel Oil Engines of 6, 10 and 15 B.H.P. and Diesel Engines of 5 to 20 B.H.P. for Gas Oil, Shale Oil, Diesolene and Light Fuel Oils.



A typical Petter Atomic Diesel Engine Generating Set.

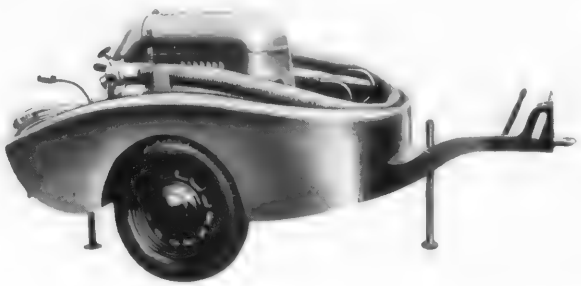
Petters, Ltd.

Good Electric Light Essential

The Civil Defence Act made it necessary immediately on the outbreak of war to obscure all indoor lighting by suitable covering of all windows and roof lights, but as work will of course still go on, the full normal lighting will be needed in all factories. In the event of an air raid all lighting must be extinguished so that there would be no need for any reduced illumination in working areas, except possibly for a brief interval during the process of taking cover.

Furthermore, on account of the possible broken glass the window coverings of very many premises will need to be of some stout material which will not easily be removable by day, and in these cases artificial lighting will be needed by day as well as by night.

The Benjamin Electric, Ltd., of London, N. 17, points out that suitable and adequate lighting so necessary in normal times is all the more necessary now to enable industry to carry on.



Mobile Fire Pumps

The A.R.P. 120 and 250 Fire Pump Units, in addition to fire-fighting are also suitable for pumping services, and may be used advantageously for several duties in the food industry where a portable unit is required. In this modern portable self-contained pumping set the most advanced hydraulic design is combined with the utmost of mechanical excellence. These are one of the newest items of plant made by Worthington-Simpson, of Newark-on-Trent, Notts, who also are well known for air pumps, boiler-feed pumps, centrifugal pumps, compressors, condensers and other engineering products.

Portable Shelters

Key men in the A.R.P. service, public utilities and industrial undertakings will be subject to great danger during air raids. For their protection Constructors, Ltd., of Birmingham, have designed and produced the "Consol" Portable Shelter, the main feature of which is its resistance to shrapnel, falling masonry, glass, etc. The "Consol" Shelter is made in two sizes for two or four men. The dimensions shown on the drawings are for the Mark II Shelter to protect two men.

The door can be latched from the inside and outside, is hung on strong hinges, and is high enough to render comfortable movement possible. The lower edge of the door frame is high enough to minimise the danger of poison gases, which are specifically heavier than air.

The ventilation is perfect and the shelter is not affected by overheating.

Four flanges are provided for bolting down, and there are also four holes in the base for alternative fixing.

Transport is simple, as there is a strong eye in the apex, which permits lifting by means of a crane or pulley block.

The shelters are fitted with two seats.

Another useful A.R.P. product is the "Consol" gas-tight container for safeguarding food, isolating contaminated clothing and many other uses.

THERMOMETERS, RECORDERS, ETC.

Electric Current Control

The "Humatagraph" Humidistat is employed to control electric current according to the changes of the relative humidity of the surrounding atmosphere and can be used to operate motorised valves, electric heaters, test rooms, humidifiers, de-humidifiers and air-conditioning plants, etc.

The most important part in a humidistat is the moisture sensitive element, as the accuracy of operation depends on the expansion and contraction of this element. This element is made of cone fibre, which is very sensitive to changes in the relative humidity and is so reliable that it seldom requires adjustment.

The expansion or contraction of the cone fibre element operates the mechanism, which in turn tilts the mercury switch. This mercury switch has been specially designed to carry large electric currents and can safely be used in places where open arcing of contacts would be dangerous. The standard models have a range from 3 amperes at 50 volts D.C. or 250 volts A.C. non-inductive to 20 amperes at 250 volts A.C. or D.C. inductive.

Special models can be supplied suitable for electrical supplies up to 50 amperes at 500 volts A.C. or D.C.

By a special device incorporated in the mechanism each instrument can be made to make contact on either increase or decrease of relative humidity.

For humidifying and de-humidifying installations a three-electrode mercury switch is fitted.

The range on the 3-ampere models is 30 to 90 per cent. and on all other models 10 to 100 per cent. The normal differential setting is 2 per cent. relative humidity.

One of the latest models is a double pole mercury switch humidistat. With this instrument the circuit is completely isolated from the mains, thus eliminating the dangers of contact with live wire. All these instruments are made by the C. L. Bendick Manufacturing Company, London.

CO_2 Recorders

The instrument selected for CO_2 recording must be accurate and reliable. It is guaranteed for the Simplex Mono Recorder, made by James Gordon and Co., Ltd., of Stanmore, Middlesex, that its accuracy is equal to the Orsat, which is the standard hand testing instrument for gas analysis.

The water-operated Mono Recorder is already familiar to many engineers. The new type of recorder is similar in principle, but is operated by a small electric motor and is more easily installed.

The principle of operation is described in a booklet issued by the manufacturers.

Another instrument made is the Duplex Mono Combustion Recorder, which has the advantage over the normal CO_2 Recorder in that it records unburnt gases (if present) in addition to the CO_2 in the boiler exit gases. The presence of unburnt gases indicates incomplete combustion, and in such a case, although the CO_2 reading may be satisfactory, the heat losses will be substantial.

The objection to the double reading instrument has been on account of its somewhat complicated design, but the new Duplex has reduced the double functions to simplicity itself.

A control panel used for mounting the regulating equipment gauges and instruments for Combined Steam Pressure Reduction and De-superheating.

Another leaflet issued by the same makers concerns the Hagan System of Automatic Boiler Control. It is, of course, well recognised by combustion engineers that the main advantage of automatic boiler control to the industrial steam user is that it will ensure constant steam pressure regardless of load fluctuations, at the same time increasing the efficiency of the plant and making large fuel savings.

Other items which have been supplied to a large number of food factories are Hagan Pressure Reduction and De-superheating Equipment.

Instruments for Food Storage and Transport

The increasing efficiency of food storage in the last few years has been due to intensive research and increased accuracy in the control of storage conditions. The effects are obvious: fresh fruit in prime condition is available all the year round, whilst meat, fish and other perishable commodities can be transported and stored for long periods without deterioration.

Fruit usually requires accurate control of both temperature and the gas condition of the storage chamber; meat and fish may be satisfactorily preserved by controlling the temperature, but recent research indicates the desirability of also controlling the gas conditions. Different commodities require different conditions and in many cases the tolerance factors are narrowly defined; shipping companies, importers and in many cases Government Departments now demand a high order of accuracy in measuring instruments for this purpose and more stringent regulations may be enforced in the future. Fruit-growers are enabled to keep their crops in prime condition, until the market is such as will enable them to sell to the best advantage.

Among the apparatus specially designed by the Cambridge Instrument Company, of London, S.W. 1, for food preservation and described in a new folder are Electrical Thermometers, Instruments for Gas Storage and Mechanical Thermometers. Of special interest is the combined O_2 and CO_2 indicator for the fruit store and also the portable CO_2 indicator. Another folder describes the Cambridge Automatic Regulators which give reliable service for all industrial applications where a robust inexpensive form of automatic temperature control is required.

Cheese, Fruit or Yeast Thermometer

A thermometer has been specially designed having a pointed and reinforced bulb that enables it to be inserted into any semi-solid matter with perfect safety. It is also hygienic, as there are no corners for the food to lodge, and as the bulb makes direct contact with the substance tested, a quick and accurate reading is ensured.

The chromium-plated brass case is fitted with a special top, which, by unscrewing the cap from the bushing, the thermometer is easily removed for cleaning; this feature also enables a replacement tube to be quickly and effectively fitted. The overall length is 6½ in., and the scale range may be made to order. It is made by the Industrial Thermometer Company, of Clerkenwell, London.

MARGARINE PLANT

One of the latest developments in plant for making margarine and compound lard is the "Rotosan" machine, made by the Atlas firm, particulars of the machine being obtainable from Henri Engel, London, W. 1, sole selling agents. Apart from the melting tanks and mixing vats, the entire process takes place in the one machine only, and the raw materials, entering at the bottom, emerge at the top as the finished product.

One of the principal features of the "Rotosan" machine is that it produces margarine or compound lard, without the need of any particular refrigerating machine. In all places where water of a temperature from 47° to 50° Fahrenheit is available, the "Rotosan" can produce margarine or compound lard without any difficulty.

Another type of plant is the Atlas-Lardin, which is supplied in sizes producing ½ ton and upwards. The machines are designed for continuous production, and no churns, kneading tables, mixing machines or ripening rooms are used. The whole process is described in an illustrated booklet issued by the agents.

ELECTRIC PASTRY OVENS

The new G.E.C. Electric Pastry Oven is suitable for baking small loaves, rolls, cakes, pastry and sponge goods. It is available in single- or double-deck form, and is eminently suitable for small cafés, restaurants and "Home-Made" cake shops.

The general construction follows the lines of all G.E.C. baking ovens in that it is simple and robust. An adequate layer of heat insulation between the inner and outer cases makes for the highest efficiency in operation.

The addition of a second deck can be made, without alteration to the existing oven or stand being necessary.

Following the standard practice of the G.E.C., the elements are placed in the top and bottom of the oven and are arranged so that the heat is distributed evenly. Robust construction and adequate protection ensure very long life and freedom from breakdown; replacements can, however, be effected easily if required.

Three-heat switches are so arranged that both the top and bottom elements can be controlled independently of

each other, thus allowing any variation to be made in the oven temperature in the easiest possible manner.

Fuses and pilot light holders are provided, the fuses being accessible through the cover plate on the right-hand side of the oven.

Other interesting items of cooking equipment made by the General Electric Co., Ltd., of Kingsway, London, are their new pattern Electric Double Oven Ranges, heavy-duty ranges for hotel and restaurant kitchens and a very useful Electric Griller of the pressure type, designed for the very rapid grilling of steaks, chops, etc.

STEAM TRAPS

A Special Type

In the past year considerable modifications have been made to the manufacture of Spirax Float and Thermostatic Traps, and a special type has been made which is suitable for steam pressures up to 200 lb. per sq. in. All Spirax Float Traps are now fitted as standard with stainless steel floats on pressures above 25 lb. per sq. in., and in doing this new use is being made of new methods of fabrication which have only permitted the manufacture of such articles in the last two years. The floats used in the traps have to weigh not more than 2¾ oz., and have to stand a working pressure of 200 lb. steam, together with constant changes of temperature and, at times, mildly corrosive condensate. The makers are Spirax Manufacturing Co., Ltd., of Cheltenham, Glos.

POWER TRANSMISSION

Shafting and Pulleys

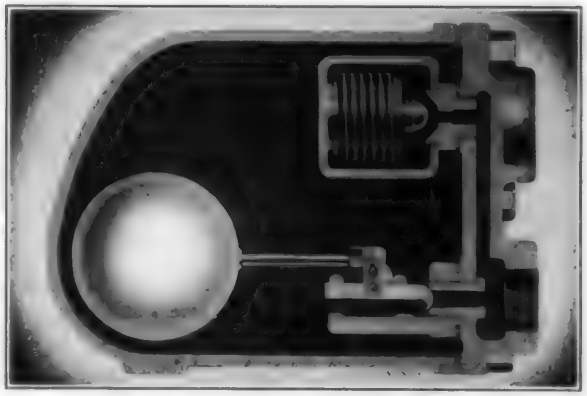
In many factories the primary cause of trouble is the shafting and pulleys. If the motor is the heart of a factory these might be well called the nerves, for they transmit the power from the motor to the machines; on them the whole plant depends.

The London Shafting and Pulley Co., of London, N. 1, concentrates entirely on the varied types of shafting and pulleys of which they carry a shock of between 15,000 and 20,000 items, comprising shafts from 6 to 30 feet in length, and pulleys from 2 to 48 inches in diameter.

In addition to its huge stock of standard units, the company is in the position to manufacture motor pulleys of any kind at short notice.

Chain Drives

The range of Morse products includes the Standard Chain Drives up to 100 h.p., using Morse Segmental-Bush Roller and Inverted Tooth Chains; Morse Flexible Couplings and Selection Curves; Conveyor and Special Chains; Special Design Wheels and Pinions.



A Spirax Steam Trap.

The Morse Chain Company, Ltd., of Letchworth, Herts, have issued a well-illustrated catalogue which shows a wide range of Morse Roller and Inverted Tooth Chain Drive applications.

REFRIGERATING PLANT

"Kand-Kold" Eutetic System

Although primarily designed for use for the conveyance of ice-cream, this system has other applications where the transport of frozen or chilled products has to be held at consistent and low temperatures during a relatively long transport period. James H. Randall and Son, Ltd., of London, W. 2, point out that in cases of emergency, where the transport of food in good condition is essential, the "Kand-Kold" evaporator system would prove of great value.

The evaporator unit is specially designed and constructed for use with adequately insulated vans of 10 cwt. capacity upwards, and it can be coupled overnight to the condensing unit or low temperature circuit, which ensures that the van is ready to commence early delivery without valuable storage space being taken up by dry-ice or self-contained unit.

HEATING, COOLING AND DRYING

Heating, Cooling and Drying

Univectair standard models have had an addition of the cool air louvred type specially suitable for high mounting and for operation on high steam pressures and temperatures. Projectaires is a new departure of registered design, giving a new aspect of unit heating. Other items offered by British Trane Co., Limited, of London, E.C. 1: Univectair Coolers, Vectair Air Heating Batteries, Vectair Grilles, etc.

INSULATION, BEARINGS, ETC.

Tufnol is an interesting material made by Ellison Insulations, Ltd., of Birmingham. It combines electrical insulating and excellent mechanical properties, is resilient, can be machined or punched and does not corrode, rot or deteriorate with long service.

In a large margarine factory Tufnol rollers, roller scrapers and plungers have been installed. Since these are rustless and will not splinter, there is no danger of contamination of the margarine. The Tufnol itself suffers no ill-effects from constant contact with the fats, and it is stated that most acids, fumes and gases have no effect.

Tufnol is a satisfactory material for quiet gear wheels, and bearings of the material are being used in food factories, one of their chief advantages being that only water is needed as a lubricant. Besides the saving in running costs, the absence of oil and grease is an advantage where foodstuffs are concerned. Further reductions of maintenance costs are made by users of Tufnol bearings, as they do not score shafts and give greater length of service than those made of metal.

CUTTING AND SLICING

Machines for cutting, chopping, cubing, slicing, shredding, mashing and grinding are always of interest to all classes of people handling food, not only preserve works, bakeries, canning and food factories, but also institutions, hospitals, canteens, etc. David Fulton and Co., of Glasgow, make a large range of such machines, for which they claim ultra-rapidity of working and such features as quick loading, constant feed and ease of cleaning.

FILTRATION AND SEPARATION

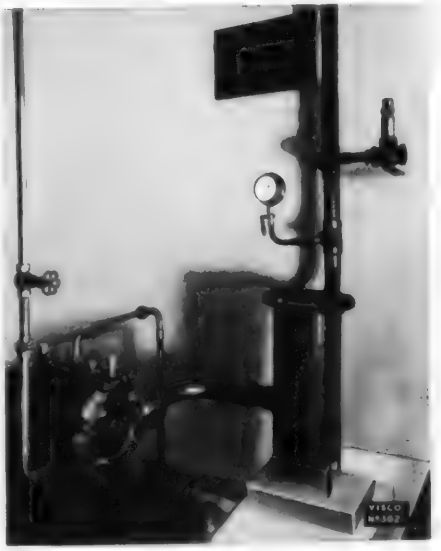
Air Filters

The "Visco" Air Filter using oil-film covered surfaces for filtration of both static and self-cleaning type has been adapted to many different kinds of work.

Where the dust loading of the air is not heavy and the dust is of a very fine nature, a Dry Filter is sometimes preferred. The "Visco" "C.E." Dry Cell Type Filter, which is giving extremely satisfactory service in numerous installations, is specially designed to meet such conditions.

These filters are ideal for use in food factories. In such cases facilities for cleaning filters of the viscous type are not always available, and a filter with a "throw-away" type of filter element is preferable.

All the essentials of an air filter of the "dry" type are found to a high degree in the "Visco" Patent "C.E." Filter. It is so designed and constructed that there is no risk of air by-passing the filter element; the filtering medium consists of special wadding pads which effectively extract the dust, while offering low resistance to the air flow; maintenance cost is extremely low, as the filter pads are inexpensive and only the filter medium itself needs renewing; the soiled pads can be quickly and easily removed and disposed of without raising a dust.



"Visco" Pressure Filter in compressed air line of a Cask-Washing Plant in a Brewery.

Filters of this type can be built up to any capacity, the units being simply bolted together to form a complete panel.

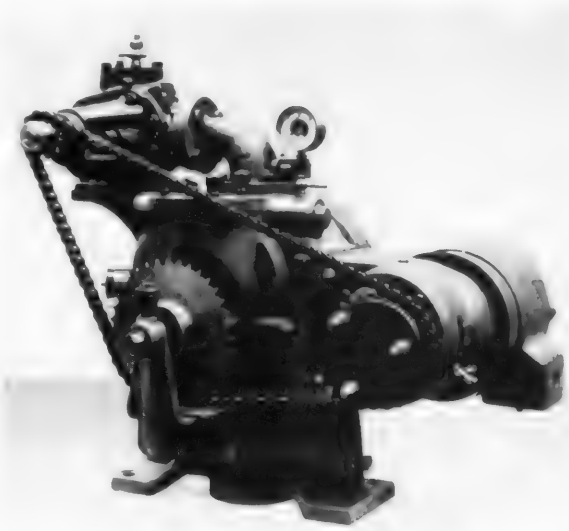
When used in conjunction with suitable pre-heaters, the "Visco" "C.E." Air Filter is capable of eliminating fog, and many plants have been installed for this purpose.

Where dust loadings are large, and an extremely high degree of filtration is required, the "Visco" "C.E." Type Air Filter can be used for second-stage filtration in conjunction with a standard "Visco" Air Filter.

The Standard viscous filter removes the bulk of the dirt, while the "C.E." Filter deals with the very finest dust. Such an arrangement ensures long life to the filter pads. Makers are the Visco Engineering Co., Ltd., of Croydon.

A New Filter Medium

Aerox filters are suitable for the filtration of such widely differing materials as saline solutions, oils, cider, vinegar, etc. The "P" grades consist of ceramic materials specially prepared at white heat, highly resistant to corrosive fluids. There are several grades for special uses. "Sterilmats" are filter pads for sterilisation and clarification. Grade S.B. for sterilising is claimed to have complete resistance to bacteria and yeasts and a faster filter removes down to the size of *B. Prodigiosis*. Food chemists will doubtless be interested in these filters, which are to be obtained from A. Gallenkamp and Co., Ltd., of London, E.C. 2.



Rotoklene Strainer.

Ashworth and Parker, Limited.

A New Strainer

The straining of fluids is a familiar item of work in the food industry, and a strainer which is cleanable without interrupting the flow of liquid through it is one which cannot fail to interest those concerned.

A new type working on a novel principle is the Rotoklene Strainer for which is claimed many important advantages. It is of simple design, and the few parts composing it are so substantial that they are not liable to failure from corrosion or weakness.

Strongly constructed, it can be operated continuously by belt or motor drive where constant cleaning is necessary.

The new winding with wire of special section offers a minimum resistance to flow and does not become choked. Straining down to 1/2000 in. can be obtained without diminution of strength. It is adapted for use on the highest pressures.

Alternatively, for those preferring wire cloth—which has its advantages for some liquids—it is fitted in a particularly well-supported and protected manner, permitting replacement in a few minutes.

In addition to the usual applications in connection with water and aqueous solutions, the strainers may be used for fuel oils, lubricating oils, chocolate, sugar solutions, and, in fact, all liquids and semi-liquids presenting straining problems. The Rotoklene Strainer has been designed and is being manufactured by Ashworth and Parker, Limited, of Bury, Lancs.

Dust Collecting Equipment

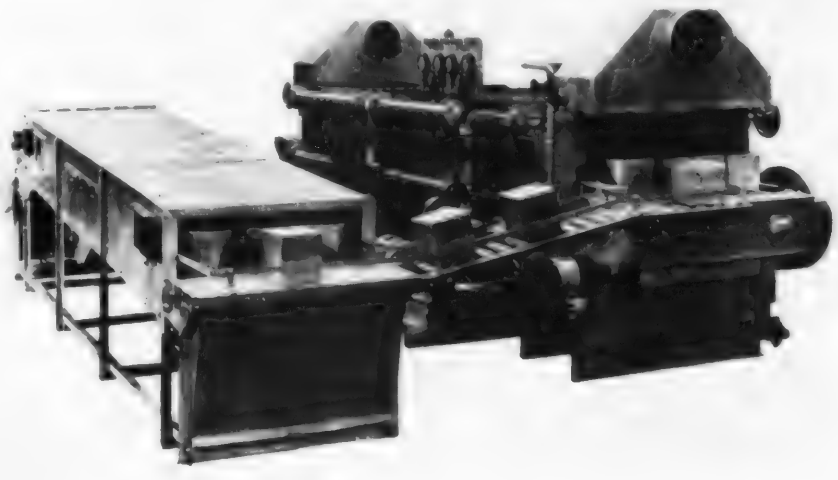
The importance of efficient dust and grit extraction plant is becoming widely appreciated. In power plants its purpose is to prevent the emission of grit which would prove a source of annoyance; in other industries, such as metallurgical works, valuable dust may be recovered.

The methods employed for the removal of solids from gases may be classified as the dry and wet systems, the former comprising the cyclone type of unit, the bag filter, and the electrical precipitator, and the latter system the spray and film type washers.

James Howden and Company (Land), Ltd., of London, S.W. 1, explain the range of their equipment in a well-illustrated booklet.

WEIGHING

A new machine introduced during the year by the Automatic Weighing and Packing Machine Company, of Birmingham, is the Automatic Weighing unit in combination with a Vibrating Conveyor for handling bags of flour or similar materials and as a special advantage in cases where material is to be dumped down for weighing. After filling on the weighing machine the bags are passed to the vibrating conveyor, the material is then dumped down as the filled bags are taken to the next position for folding and sealing.



Continuous Hydro-Electric Washing, De-labelling and Rinsing Machine Type 10 JJ for returned biscuit tins, combined through Automatic Transfer Conveyor to Continuous Dryer equipped with separately controlled motor-driven heater units.

Robert Kellie and Son, Limited, Dundee.

VERNON L. S. CHARLEY, B.Sc.
Department of Fruit Products
University of Bristol Research Station
Long Ashton

DISCUSSES
SURPLUS APPLES IN WAR TIME

THE COMMENCEMENT of the present hostilities at the beginning of September was practically coincident with the beginning of the fruit harvesting season, and the many important problems that arise from the probable size of the crop that is expected to be available need instant attention if the whole crop of apples and pears is to be fully utilised.

The Shape of Gluts to Come

For some time now warnings have appeared regarding the serious position which would arise in the event of a very heavy crop of apples and pears maturing both on the old-established orchards and the very considerable acreages of new trees. The 1936 crop gave an idea of the "shape of gluts to come", and it is absolutely impossible to avoid the conclusion that a very considerable tonnage of apples were then allowed to rot. This is often contested by some parties, but the writer visited two farms where 100 and 20 tons respectively of small and lower grade apples were filled into depressions in the ground or rolled into ploughed land with a heavy agricultural roller. Since that year the number of trees coming into bearing has increased each year, although frost damage has annually ruined thousands of acres of fruit trees, and it is not until the present year that the 1936 season seemed likely to be repeated.

Cider Apples

The south-western counties of England (Devon, Somerset, Dorset, Gloucestershire, Monmouth, Worcester and Hereford) are noted for their cider orchards, and the fruit grown in this area is almost exclusively used by cider factories for the production of fermented cider. This fruit is most definitely preferred to the cooking and dessert apples from other areas, on account of the higher sugar and tannin contents of the juices, which results in a fuller-bodied cider with a more intense aroma and bouquet. Crop forecasts are exceedingly difficult to make, and the earlier the forecast the greater are the chances against its accuracy. But, writing in mid-September, 1939, it is possible to say that there is a large crop of cider apples, especially in Somerset and Devon. Now, this heavy crop comes in a season which succeeds a relatively poor selling year for cider, and stocks held at the moment are of such a size that it is certain that the cider industry will find a difficulty in absorbing the entire cider apple crop.

Cooking and Dessert Apples

There are also signs that the crop of these sorts of fruits is going to be a large one, and recent weather conditions have conduced to good growing conditions; in many districts apples in mid-September were filling out in a very pleasing way. But the disposal of the crop will probably be complicated by the inability of the cider-makers to take any of the cooking or dessert apples and thus one normal outlet is closed. Thus the growers of those varieties of apples that are in most general production may find it difficult or actually impossible to place their surplus of small fruit. It may be asked whether the apple juice factories could not make very much larger quantities of juice in a season such as the present one. The answer is that the production of apple juice is limited by the storage capacity of the factory, and the necessary Boehi tanks are not capable of being procured and installed at short notice. Thus at the present juncture the apple-juice industry cannot be expected to make any considerable inroads on the surplus apple position, and, with the cider outlet being restricted, it has become important to consider other means of utilising the food constituents of these apple supplies.

Authorities Concerned

Whilst the fruit growers themselves are primarily concerned with the losses involved in a wastage of fruit, they have never been organised in any way effective enough to tackle this problem at short notice. The fruit growers unhesitatingly rejected an attempt a few years ago to introduce a Fruit Marketing Board which would have had powers to cope with such a situation as is likely to occur this autumn. The severity of the criticisms of the scheme and the personal objections that were a part of the opposition suggest that the scheme is not likely to be revived for some time, and consequently the industry itself can do little to save the situation should a heavy surplus arise. The Ministry of Agriculture has been responsible for initiating the research work at Long Ashton, which is designed to discover profitable methods of utilising surplus fruit, whilst the Food Investigation Board of the Department of

Scientific and Industrial Research is now also associated with the Long Ashton work on the processing angle of fruit products. It is too early yet to state what official action will be taken regarding the position.

A contribution which was a welcome indication of a mass-attack mentality on the problem was the leader in *Food Manufacture Weekly* for July 21, and if the attitude of mind of the journal in question could be brought to bear on the problems—and they are legion and not merely of minor significance—some forward move would result and in the light of the experience achieved further progress would follow as the technical and sales problems were solved.

Other Apple Products

If cider and apple juice (the latter made by the existing Seitz-Boehi or Baumann methods) are excluded from consideration, what are the other possible products which could be made at short notice? A few suggestions are made here, and recipes from American sources are included.

Concentrated Apple Juice Products

During the last war the Long Ashton Research Station was responsible for the production of a very large output of cider apple jelly, which was made for the Ministry of Food by means of a Kestner evaporator installed in the cider-making premises at Long Ashton. Twenty-four hours a day the plant was turning out a concentrated product which, on cooling, set into a jelly by virtue of the natural content of sugar, acid and pectin in the fresh fruit. The product was received into various containers, amongst which were some upright cylindrical pots of earthenware, which became well known to the troops and general public in 1917!

Incidentally, some of these pots came to light in 1937 and the product was still in perfect condition. If the juice is de-pectinised previous to concentration it is possible to avoid a solid gel in the cold end-product and a concentrated juice which will always remain liquid can thus be produced.

Intermediate degrees of concentration, accompanied by a controlled removal of pectin, result in the production of materials such as apple treacle. This type of product is rapidly gaining popularity on the Continent, especially in Holland, and several delightful brands of this material have been examined at Long Ashton. The chief technical consideration appears to be concerned with the sugar-acid ratio. Whilst apples of extremely high acidity should be avoided, it is necessary to ensure a fairly high acidity in the product both from the point of view of ensuing stability and long storage life and to offset the sweetness caused by the 72 per cent. of sugar in the treacle. A large number of English cooking apples should be of the correct type for this purpose. Juices of higher acidity could be reduced in acidity by the addition of chalk, but this procedure is hardly likely to be economic.

Thus it is seen that a concentrating system for apple juice would enable a series of products to be made which include a solid form of apple jelly, a treacle product and a less viscous concentrated juice. This last product could naturally be used for the reconstituting of the original apple juice for beverage purposes.

The jelly, treacle and concentrated juice products are not especially liable to deterioration on account of fermentation, although mould growth is likely to arise if the sugar concentration is insufficient or if the conditions of storage are unsatisfactory. The same plant could be used for all the above products and, given the will to make some contribution to this problem, it should not be impossible to examine the above products on an appreciable scale during the coming season (October, 1939, to January, 1940).

Apple Butter

The American definition of apple butter is in these terms: "The product is prepared by boiling the screened fruit pulp with or without the addition of sugar, fruit juices and spices, to a semi-solid mass of homogeneous consistency. It differs from jam in being of higher concentration and finer consistency. It is usually heavily spiced and is frequently prepared without the addition of sugar".

Cruess gives details of two processes, in one of which use is made of added sugar, whilst in the other exclusive use of the sugar naturally occurring in the fruit precludes the addition of any further quantity of sugar.

(a) *Preparation of Fruit.*

The fruit is washed and sorted if necessary and cooked until soft with only sufficient water to prevent burning. There is no need to peel or core the fruit, as the softened apple pulp is sieved through an automatic tomato pulping machine. Generally the homogeneity of the final product is achieved by use of a tomato finisher, using sieves of adequate size.

(b) *Process without Adding Sugar.*

The method is to take the pulped and sieved material produced as described in (a) above and add fresh apple juice or syrup and boil to a suitable concentration. The usual ratio of juice to pulp is 1:1. The cider and sauce is boiled rapidly and spices are added at the end of the process. The spicing formulæ cannot be given in detail, as individual tastes are so different, but Cruess mentions that cinnamon, cloves and allspice are basic additions, each used at the rate of 1½ oz. per 100 lbs. The end-point of the boiling process is determined by consistency alone and not by the boiling point of the batches.

(c) *Process with Addition of Sugar.*

On some occasions apple butter is made by the addition of ½ lb. sugar per lb. of pulp instead of using apple juice or syrup. Brown sugar is often used in America as a dark brown colour is apparently acceptable to the consumers. In view, however, of the need to avoid the use of sugar where possible, the above process is not likely to be of such utility in wartime as the first method. The addition of sugar is, however, in general use where pears or peaches are being converted into butters. The process is the same as for apple; the boil-

ing is continued to 218° F. and ½ gal. lemon juice is added per 10 gal. of original pulp. The mixture is boiled to 221° F. and 1½ oz. each of cloves, cinnamon, and ginger, and ¾ oz. of nutmeg added to the same quantity of pulp (10 gal.).

The preservation of butters offers little difficulty if the product is packed in a boiling condition.

It is interesting to recall in this connection that, on his departure from England, Professor W. V. Cruess wrote to the writer, giving a few suggestions regarding new products to investigate. The Professor expressed his view very strongly that butters and spreads from apples should be popularised in England. Consequently the present opportunity to examine these products and to try their market values should not be missed.

Apple Sauces for Canning

These products are made by peeling, coring and quartering apples, which are then cooked until soft, usually adding a slight addition (20 per cent.) of sugar to the pulp. The sauce is canned hot, sealed and processed at 212° F. One difficulty is the avoidance of the brown colouration which occurs through oxidase activity. A quick peeling action is essential, followed by a rapid heating and cooking procedure.

Apple Crisps

During the past twelve months the writer has been able to examine samples of so-called American "apple crisps". These resemble "rice krispies" in form and consistency. The colour is pure white and the flavour is remarkably true to the fruit concerned. The most interesting flavour character, however, is associated with the acid taste, which has a surprisingly predominant effect on the palate. The sale of apple crisps is apparently just commencing to soar upwards in true American fashion, and although it is not suggested here that there is any possibility of commencing production this season, it is worth mention that such a product has been placed on the market and achieved a satisfactory demand.

Scale of Operations

The estimates of actual tonnages of surplus fruits can never be really relied upon, and very variable forecasts have been made as to the possible extent of this type of fruit. Mr. J. G. F. Goaman, Senior Marketing Officer of the Ministry of Agriculture, in a recent contribution to the *Fruit Grower*, estimated that it was possible that in some future year of a real glut crop on the full apple-growing acreages 70,000 tons of apples may be surplus to requirements. This figure evidently refers to the time when all the new plantings are in full bearing. Such a quantity of fruit would yield 11,000,000 gal. of juice, which, whilst it is a small quantity compared with Germany's 17,000,000 gal. consumption in 1937, would need some efficient marketing methods and organisation for its disposal.

On the other hand, the *Food Manufacture Weekly* leader already mentioned refers to an 8,000-ton surplus of fruit. This figure probably is concerned largely with apples, for other fruits are not usually in over-production except in abnormal years. Now, if this figure of 8,000 tons bears any relationship to *this* year's surplus, it should not be a difficult matter to dispose of the fruit.

At Long Ashton or elsewhere, where mills and presses are available, juice could be produced continuously, and one moderate-sized concentrator, dealing with 150 gal. of juice per hour would utilise 25 tons of fruit per 24-hour day. Over a period of 90 days (say, November 1st to February 1st, 1940) this one plant would utilise 2,250 tons of fruit, or more than one-quarter of the 8,000 tons surplus. The actual processing could certainly be carried out—but what of the finished product?

Past experience showed that there was no difficulty whatever in selling the apple jelly which was made at Long Ashton in the Great War. The product that can be made to-day with modern equipment is very much better than the product of 1917, and would appeal to a much greater extent than the heavily cooked, dark-coloured product. Again, there is a likelihood that Empire supplies of fruit may possibly be curtailed in favour of more essential foodstuffs, and in this case fruit products of various forms should appeal more readily to the public than in normal circumstances.

Damages for Dilapidations

By A Barrister-at-Law

IT is important for every tenant of trade premises to know the extent of his liability for dilapidations where he has entered into repairing covenants.

Repairing covenants are of two kinds. The covenant may be one to keep or put premises in repair during the currency of the tenancy, or else to put or have premises in repair at the termination of the tenancy.

In either case, however, the measure of damages for breach of the covenant is limited by statute; for S. 18(1) of the Landlord and Tenant Act, 1927, provides that the damages are not to exceed in any case the amount by which the landlord's interest in the premises has depreciated by reason of the non-repair.

No contracting out of this statutory provision is permissible, but recent cases indicate that a repairing covenant may be so framed so as to drive a coach and four horses right through the above statutory provision.

Moss' Empires, Ltd. *v.* Olympia (Liverpool), Ltd.

The most recent and indeed the most important case on the point is the decision by the House of Lords in Moss' Empires, Ltd. *v.* Olympia (Liverpool), Ltd., a case which gave rise to some conflict of opinion in the courts hereon.

In the Moss' Empires case, the lessee had covenanted to spend a sum of £500 every year on repairs and decorations to the premises, or else in default to pay the landlords the difference between £500 and the amount actually expended.

The lessees failed to spend £500 in the course of the year, and the question arose whether the balance was recoverable by the landlords.

(*Continued on page* 347)

SHOULD VITAMIN B_1 BE RESTORED TO WHITE BREAD?

Dr. James A. Tobey

Director, Department of Nutrition, American Institute of Baking

THE QUESTION of vitamin B_1 in bread has aroused so much interest lately that all bakers should be familiar with this important matter. Many noted authorities on nutrition and a number of organisations have suggested recently that white bread would be an even better product and that national diet would be greatly improved if all white bread had a higher content of the necessary food factor known as vitamin B_1.

Serious discussion of this matter began at the meeting of the American Institute of Nutrition at Toronto last April. In a symposium on the fortification of foods with vitamins and minerals, numerous scientists urged that the food substances removed from wheat in the milling of flour be restored to white bread. This proposition was also discussed at the Second Food Technology Conference held at the Massachusetts Institute of Technology at the end of June, and again at the Pacific Science Congress in Berkeley, California, late in July.

In an editorial in the July, 1939, issue of the *American Journal of Public Health* entitled, "Restoring Lost Vitamins to the Diet," the statement is made that:

"In the refining of flour, much of the original mineral and vitamin content is reduced. Some of these substances, but not all, are restored when white bread is made with milk solids, as is now the usual custom in the baking industry. White bread is our best and cheapest source of necessary food-energy, and there is no reason why it should not now be liberally used in a well-balanced daily diet, but it would be even more valuable if it contained a larger quota of the vitamin B_1 and the iron of the unrefined wheat flour."

The *Journal of the American Medical Association* for August 12, 1939, prints a report of the A.M.A. Council on Foods, which also discusses this matter of fortification of foods with vitamins. It is pointed out that there is increasing evidence that more vitamin B_1 in the diet may be desirable, and that it has been suggested that milled cereal products might well have the vitamin B_1 content restored to the B_1 value of whole grain. The Council on Foods has, in fact, adopted the following resolution:

"That the restorative addition of vitamins or minerals, in such amounts as will raise the vitamin or mineral contents of foods to natural high levels, be encouraged; with the provision that such additions are to be limited to vitamins or minerals for which a wider distribution is considered to be in the interests of the public health, and with the further provision that the additions are made only to foods which naturally are principal sources of supply of the vitamins and minerals in question."

It would seem, then, that physicians, public health workers, and authorities on nutrition are giving careful consideration to this problem, and that bakers should do likewise.

What is Vitamin B_1?

Vitamin B_1 is a chemical substance that occurs in small amounts in certain foods. Scientists have discovered its composition and have given this vitamin the name of thiamin or thiamin chloride.

This vitamin is essential to health and must be provided in ample amounts in the daily diet. The principal function of vitamin B_1 in human nutrition is to promote the welfare of the body cells. In doing this it contributes to normal growth, aids the appetite, assists in the proper use of carbohydrates by the body, prevents a certain type of nervous disorder, helps to prevent constipation, and plays a part in the avoidance of anæmia. Lack of this vitamin in the diet results in the deficiency disease known as beri-beri.

The best food sources of vitamin B_1 are brewer's yeast, whole wheat bread and whole grain cereals, pork, and vegetables. Since the vitamin is soluble in water, much of it may be lost in the cooking of vegetables, especially when the water in which they are cooked is thrown away.

The amount of vitamin B_1 in a food is measured by a unit known as the International Unit of Vitamin B_1. Nutritional authorities state that normal persons require from 300 to 500 international units of vitamin B_1 every day.

Vitamin B_1 in Bread

Various investigations show that whole wheat bread contains from 380 to 620 international units of vitamin B_1 per pound. Ordinary white bread, on the other hand, will have only from 50 to 150 international units of this vitamin to the pound, with an average figure of about 100 to 120 units.

The amount of vitamin B_1 in white bread can be increased by several methods. New milling processes have been developed, in which a high potency of this vitamin is retained in refined flour. Special yeasts high in this vitamin have also been prepared, and when used in baking white bread will impart the vitamin to it. Finally, vitamin B_1 is obtainable in concentrated form

for addition direct to dough. There is no appreciable destruction of this vitamin during the baking process, as it is stable to heat.

An increase in the vitamin B_1 content of white bread to make it comparable to that in the best whole wheat bread would not, of course, make bread a complete source of this food factor. Six slices of such bread a day would furnish the normal person with approximately one-half of his minimum day's requirements for vitamin B_1. Man does not, however, depend upon any one food for a full quota of any one of the dozen or more vitamins that he needs. Instead he depends upon a variety of foods in a well-balanced mixed diet, in which bread is plentiful.

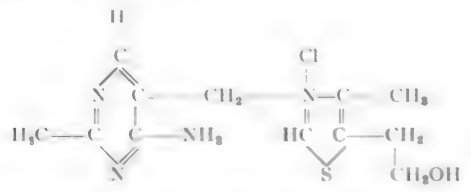
In view of the growing agitation for more vitamin B_1 in the diet, and particularly in white bread, bakers may find it desirable to investigate the various available methods for increasing it in bread, and where these are technically and economically feasible, they may wish to give these processes serious consideration.

MR. T. H. FAIRBROTHER, *M.Sc., F.I.C.*, SAYS "YES"

IN THE Editorial Comments of FOOD MANUFACTURE, August, 1938, p. 255, reference was made to the new Bayer product Betaxan, which is synthetic vitamin B_1. At the end of the comment it was stated, "It is possible that an admixture of the vitamin may be made to white flour and so restore to some extent the vitamin content of whole wheat. There seem to be commercial possibilities in this". About the time that was being written practical attention to the application of the principle was being given by the American Institute of Nutrition, and at a symposium at Toronto it was urged that the vitamins removed in milling should be restored as far as possible to white bread.

In this issue is published a news-letter to the trade by the American Institute of Baking. It is headed "Vitamin B_1 in Bread", by Dr. James A. Toberg. As there are distinct advantages and, at the same time, definite dangers which attend the addition of vitamins to food, it may be of interest to look rather closely at the history and properties of vitamin B_1.

The effects of an insufficient intake of vitamin B_1 became obvious on a large scale in the East following the introduction of hulled rice. These effects constituted a syndrome which was called beri beri. As long ago as 1878 Admiral Takaki had recognised an association between the rice diet and the incidence of beri beri in the Japanese navy. In 1897 Eijkmann found that chickens fed on polished rice developed polyneuritis and that they could be cured by adding rice husks to the diet. This led to the production of extracts of rice husks. In 1927 Jansen and Donath isolated the anti-neuritic vitamin in pure crystalline form from rice polishings. In 1931 the same active principle was isolated from yeast. In 1936 Andersag and Westphal established its structural formula and then synthesised it. The vitamin is a combination of a pyrimidine base and a thiazol ring called thiamin



It is widely distributed in the plant world, but the germ of cereals and yeast provide the most concentrated sources. Wheat germ contains up to 500 international units per ounce and dried yeast contains about the same amount. Obviously in the milling of white flour the vitamin B_1 is removed by the removal of the germ. It also goes without saying that it should be restored to the human diet by some means. This can be done in several ways. The germ can be cooked and returned to the flour, as is done in certain proprietary flours. It is not advisable to leave the germ in without cooking owing to rancidity. Alternatively the germ can be eaten separately as a breakfast food with milk, cream or marmalade—there are certain preparations of wheat germ on the market. Another way is to add an excess of dried yeast or to use yeasts specially rich in the vitamin. Finally, one could add concentrated thiamin or betaxan direct to the dough.

Of all these possibilities, to the writer's mind, the last is the least satisfactory and the most dangerous. Over-dosage of vitamins is as serious as a shortage, and the addition of high concentrates of vitamins by bakers is to be deprecated. The most satisfactory way seems to be to use more yeast, either as dried yeast or to use yeasts very rich in vitamin B_1. The writer has experimented with dried yeast, and the loaves produced remain moist longer than ordinary bread and they have quite a palatable flavour, which is, of course, of a yeasty type. One cannot help feeling that this method of addition would be more approximating to the natural way and the danger of over-dosage would be very slight. The writer is aware that certain workers do not consider the danger of hypervitaminosis B_1 to be serious. Peters (*B.M.J.*, 1936, p. 903) said, "There seems to be no danger of over-dosage", and Eddy and Dalldorf say that there is no evidence of harmful effects from excess of vitamin B_1. In spite of these it is well, with the addition of synthetic vitamins, to err on the safe side.

To sum up, the American Institute has called attention to a most important problem. Vitamin B_1 is removed from white bread because the germ is removed from white flour. Is it advisable to restore this? As the vitamin cannot be synthesised by the animal organisms it appears that the answer is yes. This being so the question arises, How shall it be restored, and the answer to that seems to be by the addition of yeasts rich in B_1 or the addition of extra dry yeast, although the restoration of the cooked germ to the bread or diet is not without its claims.

NEW FISH-FREEZING PLANT IN ESJBERG

An interesting fish-freezing plant, embodying the Heckermann freezing method, is being completed by Thomas Ths. Sabroe and Co., Ltd., of Denmark.

Arrangement of the Plant

The plant is installed in a former margarine factory building which, with some small alterations, has been made very useful for the purpose.

The arrangement of the freezing plant is as follows. The fish enters a room, where it is left at about 0° to −2° C. until it can be taken into the freezer. In the first room the fish to be frozen are hung on special trucks, being pushed into the freezer through a small antechamber.

The freezer is divided into three parts: a central part containing the freezing coils, and two freezing tunnels, through which the trucks are pushed. Two large fans circulate the air over the coils and through the tunnels. By means of dampers the air can be directed through either of the tunnels, or through both, as may be required.

When the fish is frozen, the truck is drawn through two ante-rooms and further into the stores, where the fish is removed from the truck and stowed away.

A lift connects the last ante-room with the corresponding ante-rooms in the two upper floors, which are arranged as stores for frozen fish only.

The temperature in the freezer can be maintained between −30° and −40° C. or lower, and in the stores can be maintained a temperature of −18° to −20° C. To obtain these temperatures, two separate electrically driven refrigerating plants are installed, one working on the freezer only and the other serving the store-rooms and the precooling room.

Freezing Plant

The freezing plant consists of a two-stage three-cylinder ammonia compressor of Sabroe type S. No. 18, a standard multi-tube condenser and a cross-blown evaporator coil.

To get rid of the snow which inevitably would be formed on the evaporator coils during the operation of the plant was a special problem, and, on the other hand, it was of essential importance that the coil could work most efficiently as soon as possible after the defrosting. To study this question, a similar coil was erected in the shops and worked with a specially erected compressor, and according to the results obtained with this plant the freezer coil for the Esbjerg plant was constructed.

As mentioned above, the coil is of the cross-blown type. It is divided into several parallel sections, assembled to heavy collecting pieces, and provided with specially arranged circulating pipes with liquid separator.

The coil is working on the flooded system and furnished with a thermostatic expansion valve. The defrosting is done by means of hot ammonia, and in order to avoid warming the deep cooled ammonia in the coil a rather large insulated vessel is designed, into which all the cold ammonia from the freezer coil can be taken during the defrosting.

In this manner the defrosting can easily be undertaken and the plant be ready again for freezing in about one hour.

Store-Room Plant

The store-room plant consists of a normal one-stage ammonia compressor with a multi-tube condenser and with ordinary evaporator coils in the store-rooms, cross-connections being provided between the two plants.

The compressors are driven from electric motors by means of V belts, and the motor for the store-room compressor has speed regulation.

The condensing water is taken from two wells on the Company's site, and from which condensing water at 10° C. is always available in sufficient quantity.

The plant, being planned for freezing of several tons of fish per day and for storing of several hundred tons when completed, is built on the most modern principles as to system and temperatures.

When constructing the plant the aim has been to utilise not only the Company's own experiences within the freezing business, but also to make use of the information and experience from freezing plants in other countries which have been at their disposal, so that the plant in Esbjerg could be as perfect as possible within the limits given.

The preliminary tests with the plant show that it has fully met the requirements. It appears, for instance, that a temperature of −40° C. and below is easily obtained in the freezer, and that the different manœuvres with regulating, defrosting and so on can be undertaken with ease and without any difficulties.

Abstracted from Sabroe News.

Damages for Dilapidations

(*Continued from page* 344)

The House of Lords held that the sum was in the nature of a debt. It was not "damages", and S. 18(1) of the Landlord and Tenant Act, 1927, did not apply so as to prevent the sum from being recoverable.

In another case, Plummer *v.* Ramsey, the tenant had agreed to pay the landlord a fixed sum upon the determination of the tenancy in lieu of dilapidations. The court in this case as well held that the sum was recoverable, even though it happened to be in excess of the amount which only would have been recoverable had the damages been assessed according to the measure laid down by the section—*i.e.*, the amount after depreciation of the property caused by the non-repair.

In another case, Scantlebury *v.* Cassier, the tenant was given an option to pay a fixed sum in lieu of dilapidations at the end of the tenancy. It was held that the option was exercisable even after the tenancy had come to an end, so long as it was exercised within a reasonable time thereafter. But it was further held that in default of the exercise of the option by the tenant the landlord was entitled to rely on his ordinary rights, and to have the damages assessed according to the measure and basis laid down by S. 18(1) of the Landlord and Tenant Act, 1927, and thus perhaps to recover far more than what the tenant might have paid under the option.

Tenants should therefore carefully consider the clauses to repair which the landlord is proposing to insert in the lease; for there is a real danger of the tenant undertaking far greater burdens in the matter of repairs than those contemplated or permitted by S. 18(1) of the Landlord and Tenant Act, 1927.

There are of course other problems which are raised by the above provision, but we hope to return to the subject later.

Book Review

THE NEWEST FRUIT INDUSTRY

Fruit and Vegetable Juices, *Tressler, Joslyn and Marsh. xii + 549 pp. 80 illustrations. Price outside U.S.A., $6.25.*

There can be no doubt that the event with the most far-reaching importance to the world's fruit industry in recent years has been concerned with the initiation and development of a fruit-juice industry.

Prior to 1925 only small amounts of juices from various fruits had been processed in a commercial way, and the amazing developments since that year have been concerned not only with America, where the industry has grown to phenomenal proportions, but with many other countries scattered throughout the world. Developments have occurred at differing rates in various centres of fruit production, but at the present moment every fruit-producing country is turning its attention to this question of converting a certain proportion of its fruit crop into stable juices or other products. Particularly is this the case in the British Empire, where practically every unit, whether it be a dominion, colony, dependency or a protectorate, has some indigenous fruit which is likely to become over-produced.

Information on the precise method of manufacture has been obtainable only through scattered references from various sources in America—notably the Agricultural Colleges of the various Universities, and consequently the publication of *Fruit and Vegetable Juices* has come at a most propitious stage in the development period of fruit juices in the British Empire.

The book can claim to be a most authoritative statement on the whole question of fruit-juice production. This goes without saying when it is considered that the authors have been personally concerned with many of the major advances contributed by American research workers in the industry. A large amount of data which is collated in the book was only previously obtainable by extensive searches through the literature, and much valuable information is included for the first time. Statistics are always difficult to obtain, but the authors give up-to-date figures taken from official sources which indicate afresh the remarkable increases in production during recent years.

For firms who are considering the manufacture of fruit juices the chapter on plant lay-out is of great interest. The importance of an effective disposition of machinery cannot be appreciated without practical experience, and the suggested schemes give evidence of being well thought-out and of satisfactorily solving the various problems.

The complete details of manufacture are given for the whole range of citrus, berry and currant juices. The broad outlines of these methods were already known to workers in this country, but the detail with which the subject is treated is of great value, and many points of exceptional importance are raised in the course of this section of the book. Very little attention has been given previously to such products as passion fruit juice and pear nectar, but information on these liquid beverages is given.

Apart from fruit juices, a chapter of the utmost value is included on the subject of vegetable juices. Under the new conditions imposed on the agricultural industry on account of the present war, it is obvious that the very greatest effort will be made to increase the home production of vegetables, and steps are already being taken with this in view. It would appear that provision may be found necessary for providing an outlet for vegetables which are unsuitable for the normal cooking purposes, and the conversion of this quantity of material into a stable juice retaining as much as possible of the health-giving qualities of the raw material should provide a valuable auxiliary conservation of food material. The production of juices from the following materials is discussed: Sauerkraut, rhubarb, carrot, celery, spinach, asparagus and beet, whilst reference is made to the very latest development in New York State which is associated with the marketing of mixed juices.

Those who have followed the development of the fruit-juice industry in recent years have been impressed with the fact that great stress has been placed in propaganda material on the nutritive value of these products. They have not been sold merely as beverages, and this fact is acknowledged by the authors, who have included a section on the nutritive value of fruit and vegetable juices.

Many tables are given which, whilst they refer almost exclusively to American information and consequently omit a great deal of work of the very highest value from other countries which would have served to make a more authoritative statement possible, throw into high relief the valuable selling points which are associated with correctly processed juices.

It is unfortunate that the authors have not included precise figures for the ascorbic acid content of fruits other than apples and citrus fruits, and their statement at the top of page 343 is not actually in accordance with published data. Many of the fruits listed as being specially high in vitamin C have been found in this country to be very low, whereas black-currant juice, which is not mentioned, has a vitamin C content nearly three times as high as citrus juices.

The book concludes with full and valuable chapters on fruit-juice concentrates, syrups and beverages which can be prepared therefrom together with a section on utilisation of residues.

The average foreman or man in charge of the blending room would probably collapse if expected to follow out the suggestions contained in the authors' chapter on "syrup algebra", and perhaps it can hardly be expected that occasions will often arise in which this method would be any advance on that adopted by the existing foreman; but the inclusion of this section serves to indicate the thoroughness of the treatment given by the authors.

The appendices contain many extracts from the Food and Drug Laws of the United States of America, many of which have not been read by the reviewer elsewhere. It is interesting, in view of the present moves being made in this country to standardise fruit beverages, to note on page 485 a list of misleading words and statements in the labelling of fruit juices. Evidently a certain type of mentality with a predisposition to coin these phrases is not the monopoly of any one country!

The book is well produced and printed, contains an almost complete absence of printing mistakes, and can be thoroughly recommended as an up-to-date statement on fruit-juice manufacture.

V. L. S. C.

Ether: Proposed Safety Methods for Storage

In connection with the dangers of explosion of ether due to the formation of peroxides, the following suggestions have been made in Germany for safe methods of storage.

The phenolphthalein test is proposed for the detection of the dangerous peroxide. Pure ether that has been stored in accordance with directions always gives a completely negative reaction with phenolphthalein and only a white opalescence with Nessler's reagent. Purification of ether is best done by the method of Williamson. Accordingly, 1 per cent. each of powdered potassium permanganate and potassium hydroxide sticks is added to the ether, the mixture is shaken once daily for 8 days, and then the ether is distilled off, the first portion of the distillate being discarded. The product must be stored in the dark.—*Ind. Eng. Chem.* (*News Edition*), 1939, **17** (6), 209; *A.B.C.M. Quarterly Safety Summary*, 1939, **10** (38), 17.

INFORMATION AND ADVICE

Soya Flour—Jelly for Flans—Carragheen Moss—Bottled Fruit Processing—Puff Cracknel Biscuits—Information Supplied

Soya Flour

5,590. *Can you oblige me with any information regarding the uses of soya flour in soup cubes, sauces, etc.? Such information as to the quantities which are most suitable and the method of incorporating the soya flour in such products would be most useful.* (London.)

This flour, of course, is used fairly extensively in sauces, etc., and can be used in soup cubes, but the quantity is purely a matter of the nature of the product handled. As regards the incorporation of soya flour in such products, the method would follow the usual one employed for incorporated powders, the object being to avoid the formation of lumps which might possibly be difficult to eliminate in the mixture of materials.

If you were to write to the manufacturers of soya flour they would, no doubt, be pleased to give you some further information and recipes. The names of the manufacturers of soya flour were given.

Jelly for Flans

5,561. *We should be greatly obliged if you could let us have a recipe for the manufacture of "Quick Set" or "Cold Process" jelly, as used in the bakery trade for flans, etc. We should prefer, if possible, a formula in which 100-grade citrus pectin is the jellifying agent employed.* (London.)

You may try the following recipes:

First Quality Fruit Jelly.

Sugar	50 lb.
Fruit juice	50 ,,
Pectin	2-8 oz.
Acid solution	2-7 ,,

Cheaper Grade.

Sugar	100 lb.
Juice	80 ,,
Pectin	1 ,,
Acid solution	12 oz.

The acid solution is made by adding to 1 gal. of hot water any of the following quantities of fruit acid: 3 lb. tartaric acid, 4 lb. citric acid, 4 lb. malic acid.

Carragheen Moss

5,597. *Can gum tragacanth be successfully substituted by ground carragheen moss in the manufacture of sauces, jams, etc.?* (London.)

According to our information ground carragheen moss has been successfully substituted for gum tragacanth in the manufacture of sauces, jams, etc.

Bottled Fruit Processing

5,622. *We gave one of our customers the information on bottled fruit contained in your manual for 1939, and he has now asked for further information.*

He states that no difference appears to be made on the size of bottle used, and suggests there should be a difference between processing 26-oz. and 40-oz. bottles. As there is not much difference in diameter we presume the processing time would be the same, but would be glad to have your confirmation on this point. (London.)

Provided, as you say, there is no difference in diameter between the two sizes of bottles, the processing time should be similar. Your customer, of course, may rapidly check the temperatures in the two cases after having received similar processing times, and should the contents of the larger bottles fail to arrive at the required temperature the time should be increased.

Puff Cracknel Biscuits

5,483. *Would you kindly forward to me a recipe for "puff cracknel" biscuits, stating boiling time, type of boiler used, oven temperature and baking time?*

Also, could you offer some explanation to the following problem concerning puff cracknel biscuits:

At our particular works we make, on the average, four quarter-sack mixings per day. All mixings are identical, eggs whisked the same length of time, boiling and baking times all identical, yet (and here is the problem) the biscuits vary in size very much, some being as much as 3 in. in diameter, whilst others are as little as 2 in. in diameter. This is the case, not only in different ovenfuls, but even on the same pan of biscuits. (Lancashire.)

The enquiry you make concerns an exceedingly specialised branch of biscuit making, and would probably want some actual research to attempt to solve the problem you mention, and we would suggest that you get into touch with a consultant who may work the thing out for you.

Information Supplied

5,445. *Can you give us names and addresses of firms supplying hand-canning plant for fruit canning?* (Stirlingshire.)

This information was given.

5,467. *In the May issue of* FOOD MANUFACTURE *there is an article on "Jam" by E. F. Eaton, A.I.C., in which it is stated, under the heading "Water", "Fortunately the calcium salts can be removed from water both cheaply and easily". Would you be good enough to let us know how this is done?* (Liverpool.)

We gave the name and address of the manufacturer of a suitable water softener.

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RECENT PATENTS

These particulars of new patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The journal can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

Cheese

A cream cheese is prepared by slowly pasteurising at 65° C. whole milk which is still warm from the cow, rapidly cooling and then curdling it by adding powdered rennet and a small quantity of sugar and of spores of *Penicillium glaucum*, the product being finally subjected to slow maturing for at least 120 days—*e.g.*, in a storage room at about 6° C. The pasteurisation may extend over 30 minutes. The amount of sugar used is usually 0·5 per cent. and should not exceed 5 per cent. by weight.

504,775. Costa, M.

Filters

In carrying out the process described in the parent specification, which comprises forcing liquid egg material against a back pressure greater than atmospheric pressure through a filter surface having an area much greater than the cross-section of the inlet pipe of the filter, two or more filters are used having common inlet and outlet conduits with valved branches so that, when one filter is cut out for cleansing, filtration can be carried on through the other filter or filters.

504,801. Standard Brands, Inc.

Food Fats

Palm oil for use in shortening and other edible products is decolorised by heating at 200° to 350° C. and removing the heat-decomposed colour substances. The heat treatment may be effected at atmospheric, raised or reduced pressure in an atmosphere of steam, nitrogen or carbon dioxide, and preferably in aluminium apparatus. The products may be treated with (1) alkali—*e.g.*, sodium or potassium hydroxide or carbonate—(2) an adsorbent—*e.g.*, clay, carbon, kieselguhr—or (3) hydrogen, and decolorisation may be effected by distillation under reduced pressure with steam. A shortening is made by treating the heat-decolorised palm oil with caustic soda and then adsorptive clay; the oil is then blended with alkali-refined coconut and cotton seed oils, and with alkali-refined and hydrogenated cotton seed oil. The blend is treated with superheated steam, cooled, filtered and homogenised on a lard roll. Specification 327,990 (Class 91) is referred to.

505,210. Sullivan, F. M.

Complete Specifications Accepted

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

505,472. Newly Weds Baking Co., and Angell, P. M.: Composite ice-cream cake and method of manufacture.
508,082. Berlowitz, M.: Cooling of bread and the like baked food products.
507,904. Chemtex, Ltd.: Cooking meats, vegetables, and other substances normally cooked with common salt.
507,742. Brookes, N. E. (Gorton-Pew Fisheries Co., Ltd.): Method of treating fish livers, and products obtained thereby.
507,526. Schulze, W. (trading as Starke-Fabrik Golssen, W. Schulze and Co.): Potato-pulp powder and a method of and apparatus for manufacturing the same.
507,505. Genova, A. F.: Apparatus for the instantaneous preparation of ice-creams or freezing of other comestibles or potable liquids.
507,445. Corn Products Refining Co.: Production of foodstuffs.
507,384. Berry, A. E.: Cereal products, and a process for their manufacture.
507,299. Proctor and Gamble Co.: Packaging of shortening and other materials containing vesiculated gas.
506,968. Orris, E. Andersen: Manufacture of liquid animal fat or oleo.
506,769. Westman, K. E.: Wrapping machines, particularly for the wrapping of so-called mould bread.
506,730. Briod, A. E., and East, B. R.: Vitamin concentrates and the use thereof in making food products, particularly milk products.
509,755. Brandt, K.: Artificial production of fats.
509,495. Weizmann, C.: Protein preparations.

Latest Patent Applications

18143. Gouws, J. N. S., and Webb, F.: Medicinal food. June 21.
18060. MacLennan, F.: Beverages. June 21.
17866. Stevens, A. H. (General Mills, Inc.): Production of an edible cereal product, etc. June 19.
17863. Green, G. A., and Green, F. T.: Coolers for cream, etc. June 19.
17526. Triggs, W. W. (Bernam Oil Palms, Ltd.): Continuous separation of vegetable and animal oils. June 15.

NEWS

The Royal Sanitary Institute Examinations and Classes Postponed

The Royal Sanitary Institute and the Royal Sanitary Institute and Sanitary Inspectors Examination Joint Board have given notice that both bodies have decided that it will be impossible to hold examinations, classes of instruction or sessional meetings until further notice.

The work of the two bodies will continue to be carried out at 90, Buckingham Palace Road, Westminster, London, S.W. 1, so long as this is possible.

The office will, however, be closed every day not later than one hour before sunset and will be opened earlier than normal if necessary.

Should it become impossible to continue this arrangement, the registered offices of both bodies will be transferred to the Secretary's residence at "Darroch", Harrow Road West, Dorking, Surrey (telephone Dorking 2877), and the work conducted there.

* * *

Change of Personnel

Messrs. Batchelor's Peas, Ltd., inform us that Mr. MacDowall ceased to represent them as Advertising Manager on August 31.

The Company's advertising will continue to be directed by Mr. F. L. Batchelor, Joint Managing Director, to whom all correspondence relating to advertising should be addressed.

* * *

Change of Addresses

The following firms have advised us of change of address:

Miracle Mills, Ltd., of 90, Lots Road, S.W. 10, have removed to 79, Green Lanes, West Ewell, Surrey. Tel. Ewell 4560.

Duplicates of letters should be sent to old address.

G. A. Harvey and Co. (London), Ltd., advise that letters previously sent to their West End Office at 58, Victoria Street, S.W. 1, should now be sent to Greenwich Metal Works, Woolwich Road, S.E. 7. Tel. Greenwich 0020.

Communications to the following firms should be addressed as follows:

Auto-Klean Strainers, Ltd., Mayford House, Mayford, Surrey. Tel. Woking 1400.

The British Aluminium Co., Ltd., The Raven Hotel, Castle Street, Shrewsbury, Salop. Tel. Shrewsbury 4451.

Brierley, Collier and Hartley, Sunridge, Ruden Way, Epsom Downs, Surrey. Tel. Burgh-Heath 2740.